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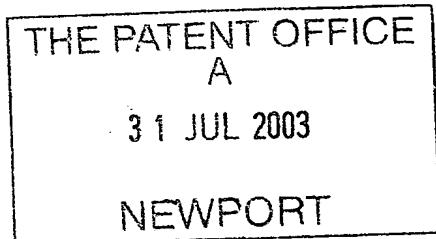
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Dated 22 September 2003

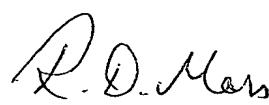


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Statement of inventorship and of right to grant of a patent

The Patent Office
Concept House
Cardiff Road
Newport
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1. Your reference	GB 920030033 GB
2. Patent application number (if you know it)	0317939.7
3. Full name of the or of each applicant	INTERNATIONAL BUSINESS MACHINES CORPORATION
4. Title of invention	COMMUNICATION WITH MULTI-SENSORY DEVICES
5. State how the applicant(s) derived the right from the inventor(s) to be granted a patent	By employment and agreement
6. How many, if any, additional Patents Forms 7/77 are attached to this form?	
7.	I/We believe that the person(s) named over the page (and on any extra copies of this form) is/are the inventor(s) of the invention which the above patent application relates to.
 Signature 30 July 2003 Date R D Moss	
8. Name and daytime telephone number of person to contact in the United Kingdom	M Mulholland Tel: 01962 818675

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31JUL03 E826844-1 000611
PO1/7700 0-00-0317939.7

Request for grant of a patent

The Patent Office
Concept House
Cardiff Road
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South Wales NP10 8QQ

1. Your reference GB920030033GB1

2. Patent application number (The Patent Office will fill in this part)
0317939.7 31 JUL 2003

3. Full name, address and postcode of the or of each applicant *(underline all surnames)* INTERNATIONAL BUSINESS MACHINES CORPORATION
Armonk
New York 10504
United States of America

Patents ADP number *(if you know it)* **519637001**

If the applicant is a corporate body, give the country/state of its incorporation State of New York
United States of America

4. Title of the invention **COMMUNICATION WITH MULTI-SENSORY DEVICES**

5. Name of your agent *(if you have one)* R D Moss

"Address for Service" in the United Kingdom to which all correspondance should be sent *(including the postcode)* IBM United Kingdom Limited
Intellectual Property Department
Hursley Park
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SO21 2JN

Patents ADP number *(if you know it)* **6847966007** EE

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number Country Priority App No
(if you know it) Date of filing
(day/month/year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application No of earlier application Date of filing
(day/month/year)

COMMUNICATION WITH MULTI-SENSORY DEVICESField of the Invention

5 The present invention relates to multi-sensory devices and more particularly to communication with multi-sensory devices

Background to the Invention

10 The mobile telephone and/or other small portable devices (such as PDAs) are now enabled for user access to, for example, the World Wide Web, driven by the Wireless Application Protocols (WAPs). As a result there is now consumer expectation that such devices will enable access to services or applications, for example the internet, in much the same way as can be achieved with a desktop personal computer.

15 Further, many of these devices are multi-sensory, primarily visual and aural, through allowing input and output interaction by use of a limited viewable area and a limited keyboard or a stylus with pointing and gesture capabilities, and by use of audio techniques (voice in or out). For example, consider a mobile telephone. The user may be looking at the viewable area and controlling the device through the keys when dialling, searching the address book, interacting with text messages, playing a game, or surfing the net. Similarly, the user may be using the mouthpiece and earpiece when conducting verbal communication. Also, in either case, the other sense may be participating in a secondary manner. For example, the user may be looking at the viewable area and also hearing information by way of a connected button earpiece.

20 30 However, one difficulty associated with this type of use occurs when there are bandwidth capacity constraints for communications between a device and the server which provides the services or applications in use by the device. For example the server may have data of different types to send to the multi-sensory device which requires, for timely delivery, more bandwidth than is available on the communication channel. In this situation the server may send data to the device which, from the aspect of the user, does not make effective use of the bandwidth available, for example by sending video data when the device is only being used aurally.

35 40 Note that US 2002/0081972 to Koninklijke Philips Electronics N.V. discloses adding an additional field to inquiry messages sent from a mobile device, the additional field containing personal data of a user. The personal data provides information which relates to the user, such as gender, music tastes, sports interests, etc. and these are used to decide

5 Alternatively the data items further have an assigned priority value, and as a result rather than allocating priority the existing priorities are increased according to the usage mode. As a result the assigned priority value for video data items is increased if the usage mode indicates that the device is being used visually and the assigned priority value for audio data items is increased if the usage mode indicates that the device is being used aurally. This enables existing priorities of data items to be reflected in the priority order which results from the usage mode indication.

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15 In prioritising the sending of data in this way the data processing host can make more effective use of the communication bandwidth with the device. Note that prioritisation could involve sending primarily or exclusively data items which match the current usage mode of the device.

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20 Optionally the usage mode indication is also provided to one or more applications that are communicating with the device. For example an application could register to be informed of the usage mode. Alternatively an application could request the usage mode when needed. This enables an application to tailor the service it is providing to the device according to the mode in which the device is being used.

20

25 Preferably the communication is intercepted in the communication protocol stack configured on the mobile device, for example the Wireless Access Protocol stack. In such a protocol stack the intercepting step preferably intercepts the communication in a protocol layer which implements any one of: Wireless Transaction Protocol; Transmission Control Protocol; and HyperText Transfer Protocol.

30

35 According to a fourth aspect the present invention provides a data processing method for a multi-sensory device to communicate a usage mode to a server, the method comprising the steps: receiving a usage mode indication of the multi-sensory device; intercepting an outbound communication; and adding the usage mode indication to the outbound communication.

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40 According to a fifth aspect the present invention provides a multi-sensory device for communicating a usage mode to a server, the device comprising: means for obtaining a usage mode indication of the multi-sensory device; means for intercepting an outbound communication; and means for adding the usage mode indication to the outbound communication.

According to a sixth aspect the present invention provides a computer program product comprising instructions which, when run on a data

Figure 3 is a flow diagram of the method of a multi-sensory device for sending a usage mode indication to a data processing host; and

5 Figure 4 is a flow diagram of a method of a data processing host when processing a usage mode indication received from a multi-sensory device.

Description of the Preferred Embodiment

10 According to the preferred embodiment of the present invention a multi-sensory mobile device, such as a mobile phone or personal digital assistant (PDA), has an awareness of the mode in which it is being used (usage mode) and can convey such information to the server (data processing host) with which it is communicating. For example, for a WAP phone, the usage mode would indicate whether the phone is being used to communicate 15 aurally (e.g: for a phone call) or visually (e.g: for viewing an internet page). Further when the usage mode changes the new type of use is conveyed to the server.

20 The device conveys usage information to the server as part of a header of a protocol, for example the Transmission Control Protocol (TCP) header, which the device uses to communicate with the server and not as part of application data for an application running on the device, for example by the internet browser being used. Use of a protocol header, as 25 opposed to application data, provides the advantage that the server may use this information for a plurality of applications in communication with the device and further use of the application data would be invidious (and potentially impossible if the application data were encrypted) for the server to inspect the application data destined for the application.

30 Further, in the preferred embodiment the server with which the multi-sensory mobile device is in communication uses the usage mode information received from the device to decide how to most effectively communicate with that device. For example the server may use the usage mode information to optimise its communication in terms of the priority order it 35 uses when deciding the type of data send to the device.

40 The preferred embodiment of the present invention is illustrated in Figure 1 which is a schematic diagram of three mobile multi-sensory devices (101,102,103) conveying a usage mode indication (121,122,123) to a server (104) with which they are communicating. Multi-sensory device 101 is a mobile phone and is currently being used to hold a telephone conversation. As a result the device includes a usage mode indication 121 of "aural" with 45 outbound communications 111, which in this case comprises the speech of the user, to the server 104. Multi-sensory device 102 is also a mobile phone

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that visual data items (211, 212, 213) be sent to the device. For example, Application 1 could be providing a clock which sends time data in the form of an analogue clock which is displayed in a window in some part of the screen of the device and is accessed at regular intervals. Application 2 is an audio/video application which has requested that different sorts of data items be sent to the device. These data items are audio data items (221, 224), mixed audio and video data items (222) and video data items (223). For example, application 2 could be providing an audio/visual presentation with a mixture of silent images, movie clips (images with sound), and audio which provides background information about silent images and/or video clips. For example the clock of application 1 could overlay Application 2 or be hidden by Application 2. Application 3 is an audio application and has requested just audio data items (231, 232) be sent to the device. For example application 3 could be a normal telephone conversation, a talking newspaper service, or a talking advertisement service.

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Note that, in fig. 2, the applications and the associated data items which they have requested be sent to the device are just examples. In practice the device may be running one or more applications, and an application may send one or more data items.

Further note that the application data held in a transmission queue does not necessarily originate from applications running on the same server as the server on which the transmission queue is held. For example the server could be acting as a gateway between the multi-sensory device and an application.

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According to the preferred embodiment of the present invention the server receives an indication of the usage mode of a device and processes the transmission queue for the device, such as shown in figure 2, according to this usage mode.

35

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Figure 3 is a flow diagram of the method of a multi-sensory device for sending usage mode information to the server, according to the preferred embodiment of the present invention. At step 301 an indication of the usage mode is received from another component of the multi-sensory device. At step 302 an outbound communication of application data is intercepted. For example this can be done at various levels in a WAP stack, for example depending on the implementation of the WAP stack, at the Wireless Transaction Protocol (WTP), Transmission Control Protocol (TCP), or HyperText Transfer Protocol (HTTP) layer. Finally at step 303 an indication of the usage mode is added to an appropriate protocol header of

the WAP stack and the layer will depend on the layer in which the usage mode indication was added by the multi-sensory device at step 303 of fig. 3. Further, note that this communication could involve transmission of application data from the device to the server, for example voice data as part of a telephone conversation or a request for a service, or could be a communication to specifically pass the usage mode data to the server (i.e.: a communication with no application data).

At step 402 the usage mode is provided to any applications which have requested to be made aware of it. For example, a clock program, such as application 1 of fig. 2, could wish to know the usage mode if it provides an alarm function and depending on the usage mode of the device it sends a visual or audible alarm.

At step 403 a check is made to see if the usage mode received from the multi-sensory device indicates "aural", and if it does at step 404 the server tailors data sent to the device to favour audio data. For example, with reference to figure 2, the server could assign a higher sending priority to data from Application 3 and Application 2, compared to data from Application 1 which comprises only video data items (211,212,213). Further data from Application 3 which comprises purely audio data items (231, 232) may be given a higher sending priority than data from Application 2 which comprises audio data items (221,224), video data items (223) and mixed data items (222). Further with regards to the application data from Application 2, the audio data items (221, 224) may be given a higher sending priority than the mixed data items (222), and the mixed data items (222) may be given a higher sending priority than the video data items (223). Note that assigning data item a higher sending priority results in it being preferred for sending to the mobile device compared to lower priority data, thus setting a priority order.

If the usage mode does not indicate "aural", at step 405 a check is made to see if the usage mode indicates "visual", and if it does at step 406 the server tailors data sent to the device to favour video data. For example with reference to figure 2 the server can give a higher sending priority to video data items from applications, such as Applications 1 and 2, and further give a higher sending priority to video data items from applications which send only video data, such as Application 1. Further, for a given application, such as Application 2, the video data item (223) may be given a higher sending priority than the mixed data item (222), and mixed data item (222) may be given a higher sending priority than audio data item (221, 224).

with reference to figure 3 and 4 could be embodied in a data processing apparatus.

5 Thus the present invention provides a method, apparatus and computer program product which enables the mode of use of a multi-sensory device to be used to prioritise the type of data which is sent to the device. The multi-sensory device sends its usage mode, for example, "aural" or "visual", as part of communications to a server. The server then obtains the usage mode and uses this information to prioritise data sent to the device. For example if the device is being used aurally, audio data is prioritised for sending to the device such that data sent to the device is primarily or exclusively audio data.

10

5. The method of any preceding claim comprising the further step of:

providing the usage mode indication to one or more applications;

5 6. The method of any preceding claim wherein the intercepting step intercepts a communication in a protocol layer which implements any one of: Wireless Truncation Protocol; Transmission Control Protocol; and HyperText Transfer Protocol.

10 7. A data processing method for a multi-sensory device to communicate a usage mode to a server, the method comprising the steps:

receiving a usage mode indication of the multi-sensory device;

15 intercepting an outbound communication; and

adding the usage mode indication to the outbound communication.

8. The method of claim 7 further comprising the further step:

20 generating the outbound communication which is intercepted by the intercepting step.

25 9. The method of either claims 7 or claim 8 wherein the usage mode indication indicates that the device is being used either aurally or visually.

30 10. The method of any one of claims 7 to 9 wherein the intercepting step intercepts a communication in a protocol layer which implements any one of: Wireless Truncation Protocol; Transmission Control Protocol; and HyperText Transfer Protocol.

11. The method of any one of claims 7 to 10 wherein the multi-sensory device is a mobile phone.

35 12. A data processing apparatus for processing a usage mode indication received from a multi-sensory device, the apparatus comprising:

40 means for intercepting an inbound communication from the device;

means for obtaining a usage mode indication for the device from the communication;

means for obtaining a usage mode indication of the multi-sensory device;

means for intercepting an outbound communication; and

5 means for adding the usage mode indication to the outbound communication;

18. The device claim 17 further comprising:

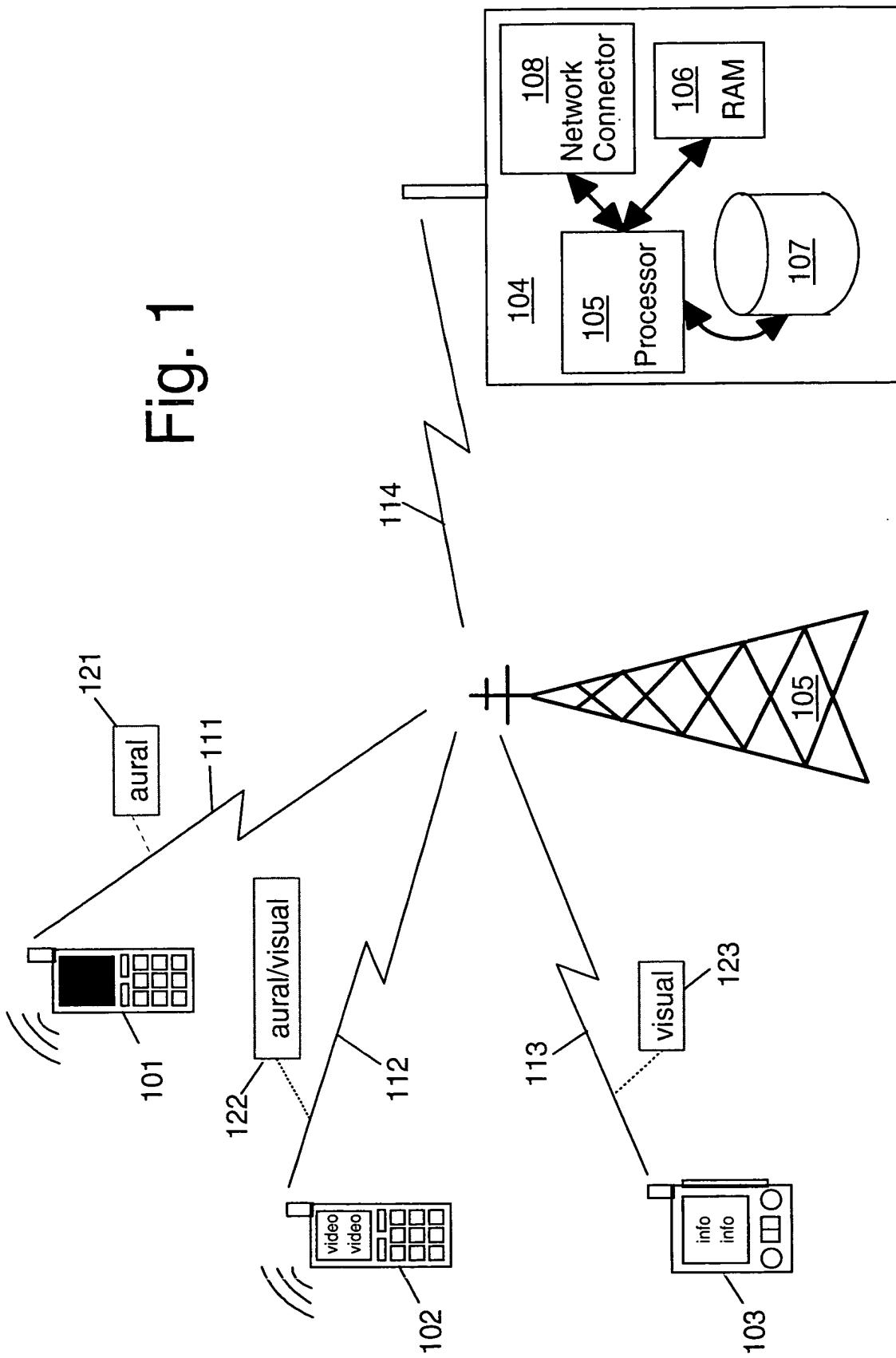
10 means for generating the outbound communication which is intercepted by the intercepting means.

19. The device of either claims 17 or claim 18 wherein the usage mode indication indicates that the device is being used either aurally or
15 visually.

20. The device of any one of claims 17 to 19 wherein the device is a mobile phone.

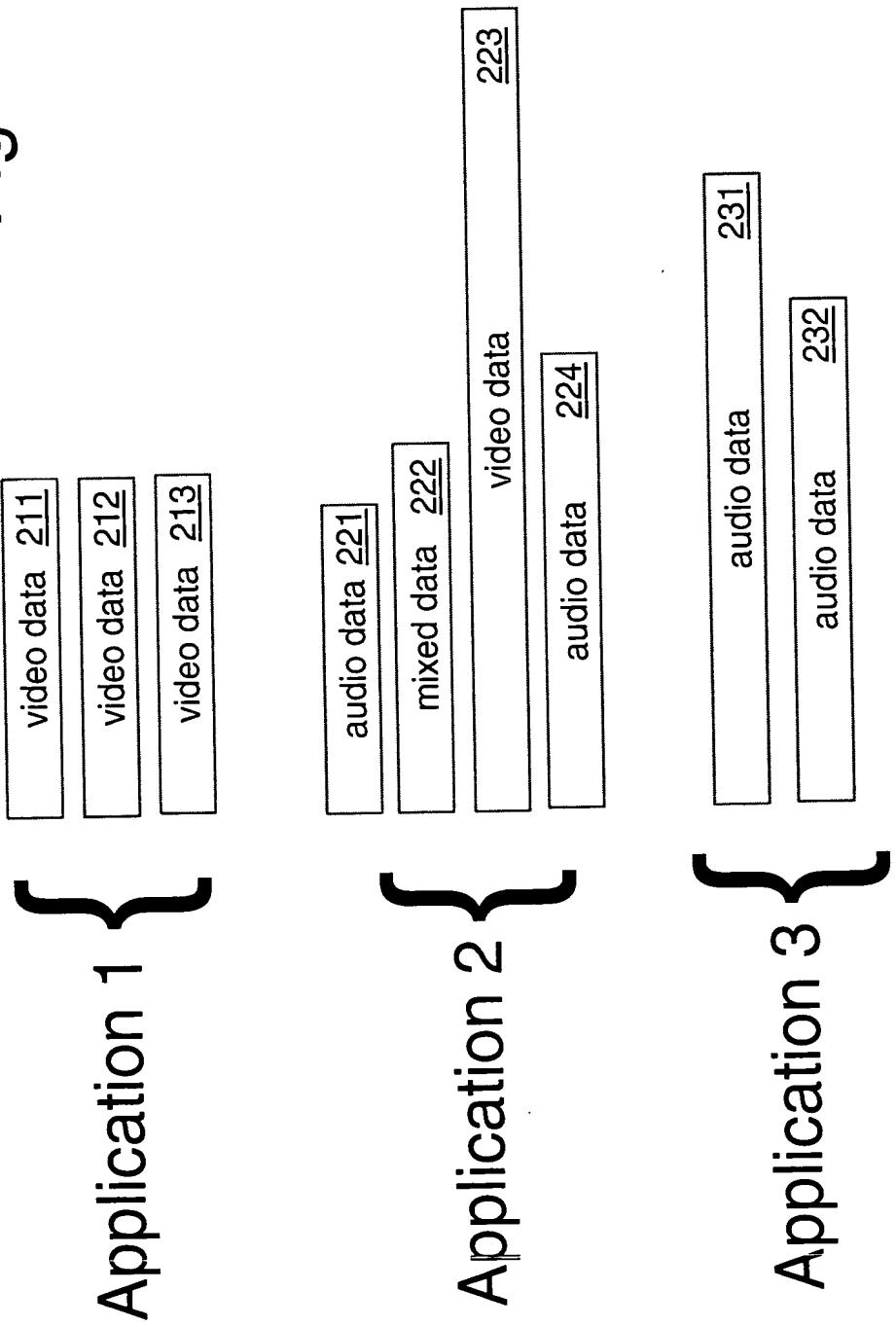
21. A computer program product comprising instructions which, when run on a data processing host, cause said data processing host to carry out a method according to any one of claims 1 to 11.

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Fig.



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Fig. 2



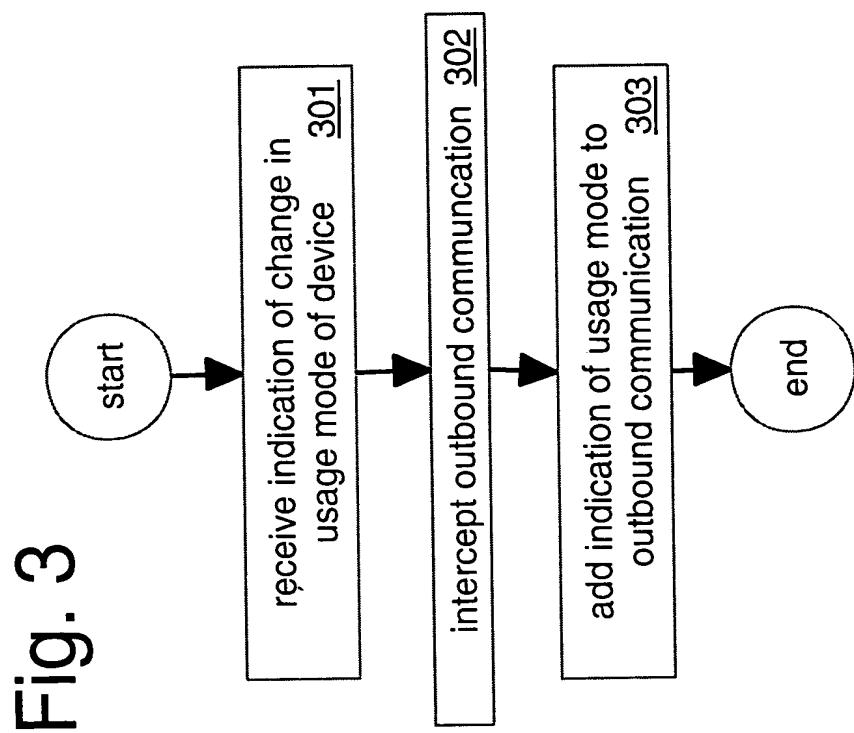


Fig. 4

